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Complete Specification Left, 14th Aug., 1901—Accepted, 14th Sept., 1901

PROVISIONAL SPECIFICATION.

Improvements in the Manufacture of Moulds for Rubber Teats.

We, MARTIN DUNPHY ARMSTRONG, of Leonard House, 25 Hampton Road, Forest Gate, in the County of Essex, Commercial Traveller, and JOHN DOWELL, of 88 Bishopsgate Street Within, in the City of London, Drug Merchant and Sundryman, do hereby declare the nature of this invention to be as follows:—

5 This invention relates to the manufacture of moulds upon which indiarubber teats are made.

Teats having plain interior surfaces are commonly made on glass moulds, but for teats with corrugated interior surfaces such as are described in the Specification of the above named Martin Dunphy Armstrong's invention for which
10 Letters Patent have been granted to him dated July 14th 1892, No. 12962—it has not hitherto been found practicable to obtain glass moulds, and such teats have hitherto been made on metal moulds, each of which has been first formed with a plain surface and in which the depressions or grooves to correspond with, and form, the corrugated surface of the teat have been afterwards cut.

15 The advantage which would accrue from the use of glass moulds instead of metal ones has long been obvious, and various manufacturers of glass goods have been employed by the said Martin Dunphy Armstrong to make such moulds and experiments for this purpose have extended over several years, but their endeavours to produce them have been up till now unsuccessful, the technical
20 difficulties attending the production of them being found to be too great.

Now the said John Dowell has discovered a method by which such glass moulds possessing all the necessary qualities of regularity of form and perfection of polish of surface and other requisite qualities can be produced on a commercial scale and at a satisfactory cost, and this invention will supply a much felt want, and
25 render the production of such teats easier and cheaper than heretofore.

According to this invention we make a metal matrix in one solid piece with a cavity the internal surface of which is of the necessary shape and configuration and polish to produce the glass moulds required, and in order to produce such metal moulds we proceed as follows:—

30 We first prepare a steel punch or male of shape to exactly correspond with the interior of the teat to be ultimately produced, or in other words it is of the same shape and size as the glass moulds which are to be made, and is slightly tapering so that the steel punch may be withdrawn from the cavity it produces. This punch is highly polished both on its general surface and in the grooves which
35 serve to form the corrugations and is tempered and hardened.

A block of softer metal, copper for instance answers the purpose well, is next prepared and placed in a press and the before mentioned steel punch, or male, is brought down on it and subjected to great pressure, by which an indentation is produced in the softer metal. This is repeated again and again, and the steel
40 male, from time to time as may be necessary, is re-heated and surface hardened and again applied to the block of softer metal until the former has been driven in to the latter to its full depth and an internal or female die or matrix is formed which has taken an exact impression of the polished surface and corrugations of the male. One result of the great pressure to which
45 the matrix has been subjected is that the internal surface has become compressed,

[Price 8d.]

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hardened, and polished to a high degree, thereby giving it a surface particularly well fitted for the production of the glass moulds.

The matrix thus produced is then used for the production of glass moulds or males, and although these may be made either solid or hollow it is found, so far as experiments up to the present have shown, that it is preferable to make them hollow by blowing the glass in the mould, and annealing in the usual manner.

The glass male moulds thus produced have the corrugated surfaces and all the qualities of polish and otherwise that are required for the production of internally corrugated rubber teats, and as a large number of such moulds have to be employed in making teats on a commercial scale it is an advantage of great importance that when once the steel male and the metal female have been made, the glass moulds can be produced of uniform size and pattern, rapidly, and at a very moderate cost as compared with the metal moulds hitherto employed.

The internal corrugated surface of the rubber teats made on such glass moulds is more perfectly smooth and polished and is much less subject to accidental flaws caused by adhesion when the teats are being stripped off the mould or otherwise than are those made on metal moulds, and by reason of such higher polish and freedom from flaws are more easily kept clean and free from decomposing milk or other matter, thus facilitating the proper feeding of children upon purely aseptic principles, and are consequently better for the health of the infant using them.

Dated the Fifteenth day of November 1900.

NEWNHAM BROWNE
Agent for the Applicants.

COMPLETE SPECIFICATION.

Improvements in the Manufacture of Moulds for Rubber Teats.

We, MARTIN DUNPHY ARMSTRONG, of Leonard House, 25 Hampton Road, Forest Gate, in the County of Essex, Commercial Traveller, and JOHN DOWELL, of 88 Bishopsgate Street Within, in the City of London, Drug Merchant and Sundryman, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

This invention relates to the manufacture of moulds upon which indiarubber teats are made.

Teats having plain interior surfaces are commonly made on glass moulds, but for teats with corrugated interior surfaces such as are described in the Specification of the above named Martin Dunphy Armstrong's invention for which Letters Patent have been granted to him dated July 14th 1892, No. 12962—it has not hitherto been found practicable to obtain glass moulds, and such teats have hitherto been made on metal moulds, each of which has been first formed with a plain surface and in which the depressions or grooves to correspond with, and form, the corrugated surface of the teat have been afterwards cut.

The advantage which would accrue from the use of glass moulds instead of metal ones has long been obvious, and various manufacturers of glass goods have been employed by the said Martin Dunphy Armstrong to make such moulds, and experiments for this purpose have been extended over several years, but their endeavours to produce them have been, up till now, unsuccessful, the technical difficulties attending the production of them being found to be too great.

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Now the said John Dowell has discovered a method by which such glass moulds possessing all the necessary qualities of regularity of form and perfection of polish of surface and other requisite qualities can be produced on a commercial scale and at a satisfactory cost, and this invention supplies a much felt want, and renders the production of such teats easier and cheaper than heretofore.

According to this invention we make a metal matrix in one solid piece with a cavity the internal surface of which is of the necessary shape and configuration and polish to produce the glass moulds required, and in order to produce the metal moulds we proceed as follows.

We first prepare a steel punch or male of shape to exactly correspond with the interior of the teat to be ultimately produced, or in other words it is of the same shape and size as the glass moulds which are to be made, and is slightly tapering so that the steel punch may be withdrawn from the cavity it produces. This punch is highly polished both on its general surface and in the grooves which serve to form the corrugations and is tempered and hardened.

A block of softer metal, copper for instance answers the purpose well, is next prepared and placed in a stamping press and the before mentioned steel punch, or male, is brought down on it and subjected to great pressure, by which an indentation is produced in the softer metal. This is repeated again and again, and the steel male, from time to time may (although it is not generally necessary) be re-heated and surface hardened and again applied to the block of softer metal until the former has been driven in to the latter to its full depth and an internal or female die or matrix is formed which has taken an exact impression of the polished surface and corrugations of the male, or instead of being operated in a stamping press the male may be driven into the block of softer metal by means of heavy hammers. One result of the great pressure to which the matrix has been subjected is that the internal surface has become compressed, hardened, and polished to a high degree, thereby giving it a surface particularly well fitted for the production of the glass moulds.

In the accompanying sheet of drawings Fig. 1, is an elevation of the steel punch or male, Fig. 2, is a plan of the underside of the same. Fig. 3, is a cross section thereof on the line *x x* of Fig. 1, drawn to an enlarged scale. Fig. 4, is a central vertical section of the matrix. Fig. 5, is a plan of the same, Fig. 6, is a perspective view thereof, and Fig. 7, is an elevation of the glass mould produced by these means.

In Figs. 1 and 2, which represent the punch or male, the face, *a*, of the punch is highly polished and has in it a series of grooves or channels *b*, which are carefully formed and rounded both at the apex and at the base as shown in the enlarged section Fig. 3. Great care is required in the formation and finishing of these grooves because any roughness or angular features in the punch would ultimately be faithfully reproduced in the internal surface of the rubber teat and would favour the deposit and accumulation of septic matter and would render the washing and cleansing of the teat far more difficult and uncertain than when the surface is perfect.

Figs. 4, 5 and 6, represent the matrix which we prefer to make of copper, and in the solid block of which the cavity *c* is formed by driving the punch in as before described. *e, e*, are the raised corrugations or ribs corresponding with the grooves *b* in the punch.

The matrix thus produced is then used for the production of glass moulds or males such as are represented in Fig. 7, and these we form hollow by blowing the glass into the mould and annealing in the usual manner.

The glass male moulds thus produced have the corrugated surfaces and all the qualities of polish and otherwise that are required for the production of internally corrugated rubber teats, and as a large number of such moulds have to be employed in making teats on a commercial scale it is an advantage of great importance that when once the steel male and the metal female have been made, the glass moulds can be produced of uniform size and pattern, rapidly,

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and at a very moderate cost as compared with the inferior metal moulds hitherto employed.

The internal corrugated surface of the rubber teats made on such glass moulds is more perfectly smooth and polished and is much less subject to accidental flaws caused by adhesion when the teats are being stripped off the mould 5 or otherwise than are those made on metal moulds, and by reason of such higher polish and freedom from flaws are more easily kept clean and free from decomposing milk or other matter, thus facilitating the proper feeding of children upon purely aseptic principles, and are consequently better for the health of the infant using them. 10

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed we declare that what we claim is:

(1) The method of producing glass moulds for making rubber teats with internally corrugated or ribbed surfaces substantially as hereinbefore described. 15

(2) As a new article of manufacture, blown glass moulds produced in a matrix formed as hereinbefore described for making rubber teats with corrugated or ribbed internal surfaces.

(3) A matrix such as described, for the production of glass moulds for rubber teats with internal ribs or corrugations, which matrix has a highly polished surface partly due to the compression of the metal caused by the driving in of the punch substantially as and for the purposes hereinbefore set forth. 20

(4) For the production of glass moulds for rubber teats with internal ribs or corrugations the use of a hardened steel punch or male to produce a matrix in which the glass moulds may be blown substantially as hereinbefore described 25 and illustrated in the drawings.

Dated the 9th day of August 1901.

JOHN DOWELL
M. D. ARMSTRONG

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Fig.1.

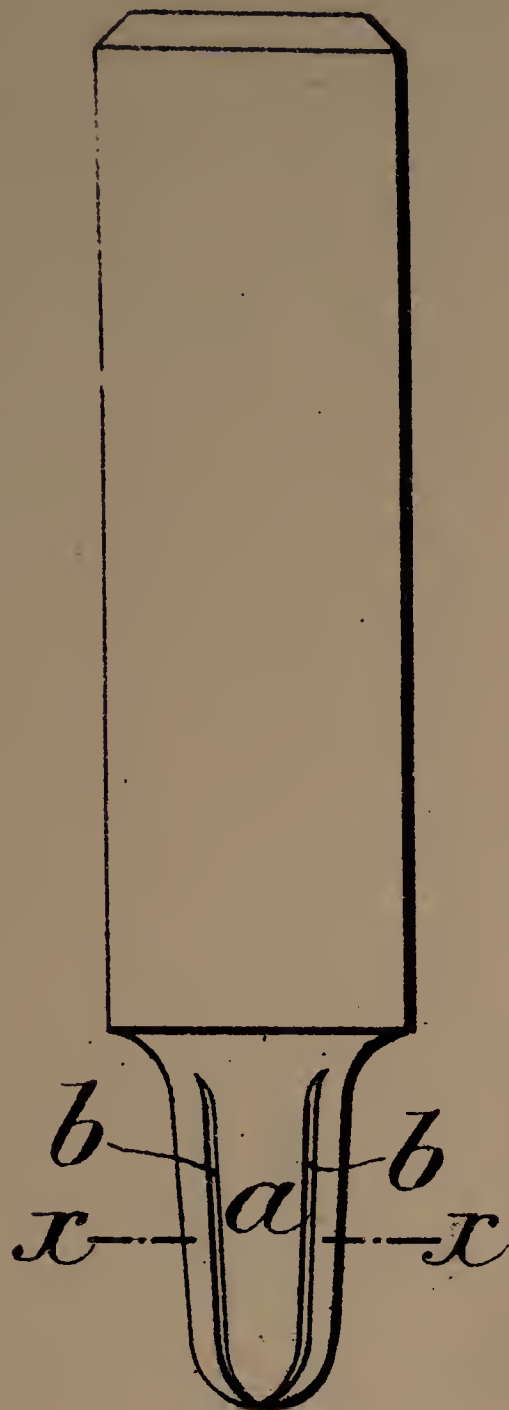


Fig.3.



Fig.6.

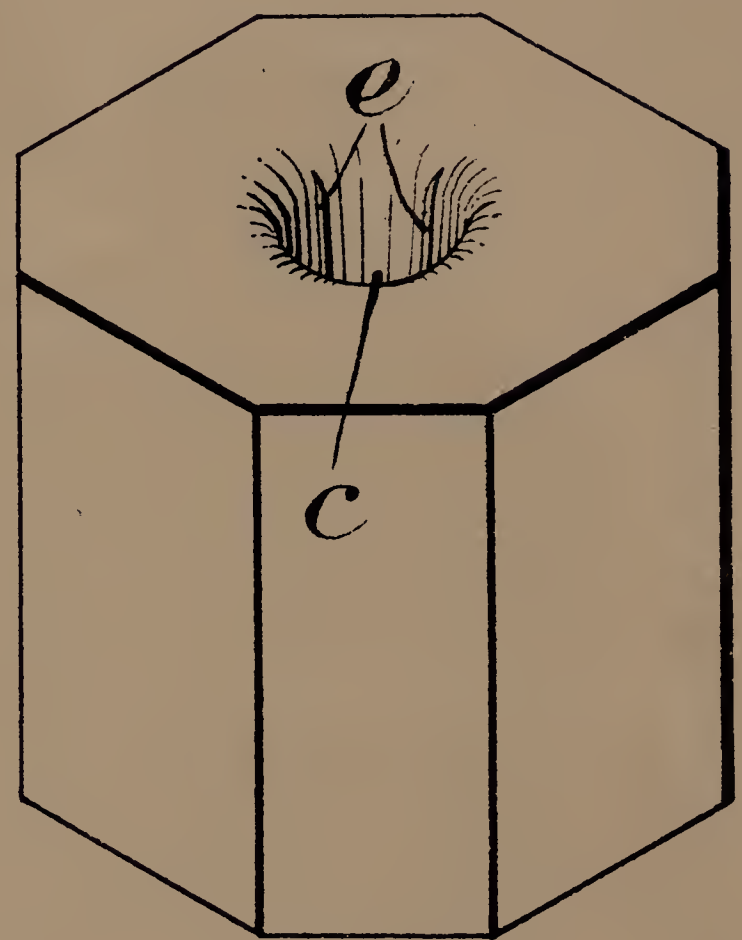


Fig.4.

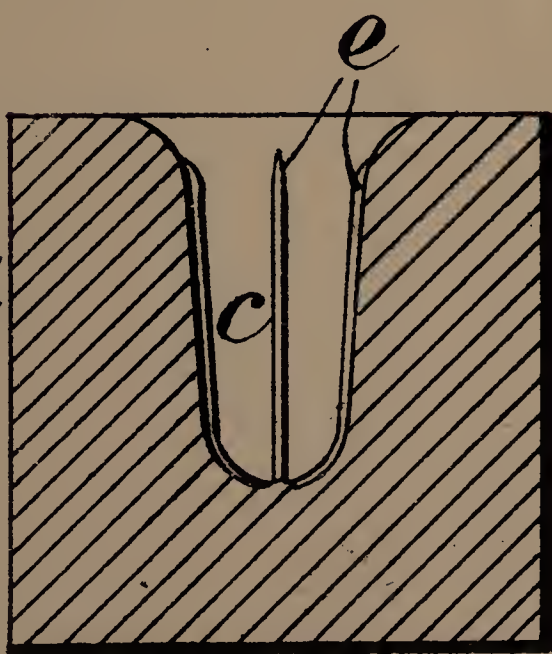
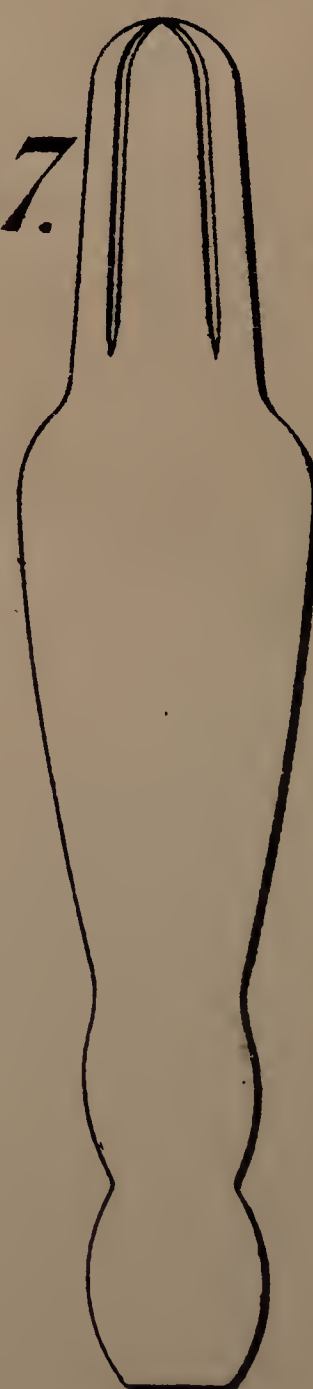


Fig.5.



Fig.7.



[This Drawing is a reproduction of the Original on a reduced scale.]

